

PRELIMINARY AMENDMENT

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Filing Date: Herewith

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a fill coupled to the titanium alloy layer, wherein the fill comprises a metal selected from the group consisting of tungsten and aluminum.

61. (New) The via of claim 60, wherein the first layer includes a titanium zinc alloy.

62. (New) The via of claim 60, further including a titanium nitride layer interposed between the titanium alloy layer and the fill.

63. (New) The via of claim 60, wherein the first layer is coupled to a sidewall of the contact opening.

64. (New) The via of claim 60, wherein the second layer is coupled to an exposed semiconductor surface.

65. (New) The via of claim 60, wherein the contact opening includes a high aspect ratio contact opening.

66. (New) A via, comprising:
a first layer of a titanium alloy within a high aspect ratio contact opening in an insulating layer, wherein the titanium alloy comprises titanium and an element selected from the group consisting of zinc, cadmium, mercury, aluminum, gallium, indium, tin, silicon, germanium, lead, arsenic and antimony;
a second layer of titanium silicide coupled to the first layer; and
a fill coupled to the titanium alloy layer, wherein the fill comprises a metal selected from the group consisting of tungsten and aluminum.

67. (New) The via of claim 66, wherein the first layer includes a titanium zinc alloy.

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15/ 68. (New) The via of claim ~~66~~¹³, further including a titanium nitride layer interposed between the titanium alloy layer and the fill.

116/ 69. (New) The via of claim ~~66~~¹³, wherein the insulating layer includes borophosphous silicate glass (BPSG).

170/ 70. (New) The via of claim ~~66~~¹³, wherein the insulating layer includes silicon dioxide (SiO₂).

187/ 71. (New) The via of claim ~~66~~¹³, wherein the first layer is coupled to a sidewall of the high aspect ratio contact opening.

197/ 72. (New) The via of claim ~~66~~¹³, wherein the second layer is coupled to an exposed semiconductor surface.

73. (New) A via, comprising:
a first layer of a titanium alloy on a sidewall of a high aspect ratio contact opening in an insulating layer, wherein the titanium alloy comprises titanium and an element selected from the group consisting of zinc, cadmium, mercury, aluminum, gallium, indium, tin, silicon, germanium, lead, arsenic and antimony;
a second layer of titanium silicide formed overlying an exposed semiconductor base layer of the contact hole;
a fill coupled to the titanium alloy layer, wherein the fill comprises a metal selected from the group consisting of tungsten and aluminum.

~~74. (New) The via of claim 73, wherein the first layer includes a titanium zinc alloy.~~

75. (New) The via of claim 73, further including a titanium nitride layer interposed between the titanium alloy layer and the fill.

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22/ 76. (New) The via of claim 73, wherein the insulating layer includes borophosphous silicate glass (BPSG).

23/ 77. (New) The via of claim 73, wherein the insulating layer includes silicon dioxide (SiO₂).

78. (New) A via, comprising:

a first layer of a titanium alloy within a contact opening in an insulating layer, wherein the first layer is produced using a method including:

forming a seed layer supported by a substrate by combining a first precursor with a first reducing agent;

forming the titanium layer supported by the substrate by combining a titanium-containing precursor with the seed layer; and

filling the remaining space of the contact opening with a metal selected from the group consisting of tungsten and aluminum.

79. (New) The via of claim 78, wherein the first layer titanium alloy includes titanium and an element selected from the group consisting of zinc, cadmium, mercury, aluminum, gallium, indium, tin, silicon, germanium, lead, arsenic and antimony.

80. (New) The via of claim 78, wherein the first layer titanium alloy includes titanium and zinc.

81. (New) The via of claim 78, further including a second layer of titanium silicide coupled to the titanium alloy.

26/ 82. (New) The via of claim 78, further including a titanium nitride layer interposed between the first layer and the fill.

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